

# Encoders

## Optical Encoders

**Features:**  
 100 or 180 Lines per revolution  
 2 Channels  
 Digital output

### Series 10B, 09B, 10BP, 09BP

		10B	09B	10BP	09BP	
<b>Function</b>		<b>speed control</b>		<b>position control</b>		
Lines per revolution	N	100	180	100	180	
Signal output, square wave		2		2		channels
Supply voltage	V <sub>CC</sub>	4,5 ... 5,5		4,5 ... 5,5		V DC
Current consumption, typical (V <sub>CC</sub> = 5 V DC)	I <sub>CC</sub>	12		12		mA
Pulse width	P	180 ± 30		180 ± 30		°e
Phase shift, channel A to B	Φ	90 ± 30		90 ± 30		°e
Logic state width	S	90 ± 30		90 ± 30		°e
Cycle	C	360 ± 10		360 ± 10		°e
Signal rise/fall time, typical	tr/tf	2,5 / 0,1		2,5 / 0,1		µs
Frequency range <sup>1)</sup>	f	0,05 to 50		up to 50		kHz
Inertia of code disc	J	0,3		0,3		gcm <sup>2</sup>
Operating temperature range		- 20 ... + 85		- 20 ... + 85		°C
<sup>1)</sup> Velocity (rpm) = f (Hz) x 60/N						

Ordering information					
Encoder type	number of channels	lines per revolution		in combination with DC-Micromotors, brushless DC-Servomotors and DC-Motor-Tacho units (preloaded ball bearings required)	
		10B/BP	09B/BP		
10B3, 10BP3	09B3, 09BP3	2	100	180	<b>free standing for independent use</b>
10B12, 10BP12	09B12, 09BP12	2	100	180	series 1628
10B2, 10BP2	09B2, 09BP2	2	100	180	series 2230, 2233, 2251
10B16, 10BP16	09B16, 09BP16	2	100	180	series 2338, 2342
10B24, 10BP24	09B24, 09BP24	2	100	180	series 2036
10B17, 10BP17	09B17, 09BP17	2	100	180	series 2444
10B14, 10BP14	09B14, 09BP14	2	100	180	series 2842, 3042
10B4, 10BP4	09B4, 09BP4	2	100	180	series 3557

### Features

These incremental shaft encoders in combination with the FAULHABER DC-Micromotors and brushless DC-Servomotors are designed for indication and control of both, shaft velocity and direction of rotation as well as for positioning.

**Type 10B and 09B are for shaft velocity and direction of rotation control only.**

**Type 10BP and 09BP are in addition for position control.**

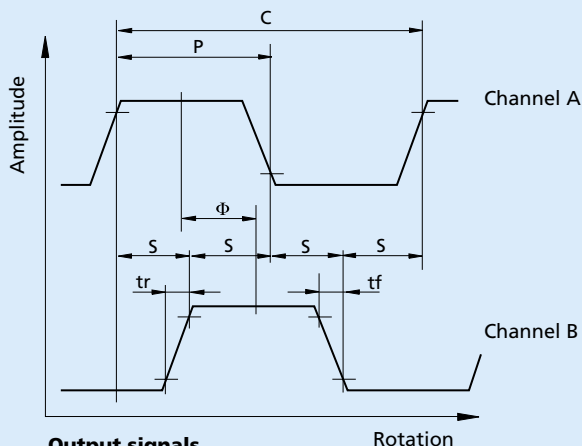
Two LED sources transmit light through a low inertia metal disc to give two channels with 90° phase shift.

The supply voltage for the encoder and the DC-Micromotor as well as the two channel output signals are interfaced with a 150 mm ribbon cable and a 10-pin connector.

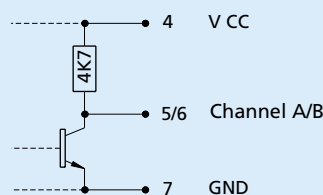
The axial and radial shaft play of the motor and the free standing encoder for independent use are eliminated with preloaded ball bearings.

Details for the DC-Micromotors and suitable reduction gearheads are on separate catalog pages.

### Output signals / Circuit diagram / Connector information



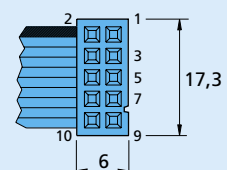
**Output signals**  
 with clockwise rotation as seen from the shaft end



**Output circuit**  
 \* Motors type 2342, 2444, 2842, 3557 have separate motor connectors

### Pin Function

- 1 -
- 2 } \* Motor -
- 3 }
- 4 V<sub>CC</sub>
- 5 Channel A
- 6 Channel B
- 7 GND
- 8 } \* Motor +
- 9 }
- 10 -



**Connector**  
 DIN-41651  
 grid 2,54 mm

